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| EDWARDS & ANGELL, LLP | | | VO, HAI | |
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1771

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/646,292

Applicant(s)

PENEZINA ET AL.

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.138(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 48-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, and 48-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Art Unit: 1771

1. The art rejections over Steuck et al (US 4,618,533) and Wang et al (US 5,137,633) separately are withdrawn.
2. The art rejections based on Callahan et al (US 4,976,897) are maintained.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-19, 21, 22, 48-52, and 55-58 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Callahan et al (US 4,976,897). Callahan teaches a composite porous membrane comprising a hydrophobic substrate coated with difunctional surface-modifying molecules. The hydrophobic substrate is polyethylene membrane having a pore size of 0.02 to 0.04 μm (column 3, lines 30-35). The photocatalyst is 2-hydroxyl-2-methyl-1-phenyl-propan-1-one (column 3, lines 62-63). Callahan discloses the use of acrylic acid as a hydrophilic monomer, which reads on Applicants'

negatively charged group. Callahan discloses the use of dimethylaminoethyl methacrylate as a hydrophilic monomer, which reads on Applicants' positively charged group. There is no pore plugging upon coating and curing (abstract). Likewise, the pore sizes of the coated composite porous membrane are substantially the same as the pore size of the composite porous membrane before coating. Similarly, the flow rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane. Since Callahan was using the same material for the difunctional surface modifying molecule as Applicants, it is the examiner's position that the preferential association, wetting characteristics would be inherently present. The coating comprises UV resin and ethoxylated bisphenol A diacrylate (table 1, column 4, lines 20-21). Either one of them reads on Applicants' difunctional surface-modifying molecule. The UV resin is present in an amount of 1 to 99 wt% and reactive diluent present in an amount of 1 to 40 wt% (column 3, lines 50-55 and column 4, lines 50-55). Since Callahan discloses the amount of the UV resin and reactive diluent could be used down to 1wt%, which read on Applicants' "less than about 1 wt%" because to the examiner, "about" means $\pm 10\%$ of the range, namely less than 1.1 wt% or less than 0.9 wt%. Alternatively, since the concentration is recognized as a result-effective variable, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical or provides unexpected results. Therefore, in the

absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the UV resin or reactive diluent in an amount of less than 1 wt% in view of cost effectiveness, permeability/selectivity of the coated membrane. This is in line with *In re Aller*, 105 USPQ 233 which holds discovering the optimum or workable ranges involves only routine skill in the art.

Callahan does not specifically disclose the membrane is autoclavable. However, it is a product-by-process limitation not as yet shown to produce a patentably distinct article. It is the examiner's position that the article of Callahan is identical to or only slightly different than the claimed article prepared by the method of the claim, because both articles are formed from the same materials, having structural similarity as discussed above. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or an obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). The burden has been shifted to the applicant to show unobvious differences between the claimed product and the prior art product. *In re Marosi*, 218 USPQ 289,291 (Fed. Cir. 1983). It is noted that if the applicant intends to rely on Examples in the specification or in a submitted Declaration to show non-obviousness, the applicant should clearly state how the

Examples of the present invention are commensurate in scope with the claims and how the Comparative Examples are commensurate in scope with the membrane of Callahan.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Callahan et al (US 4,976,897) as applied to claim 1 above, and further in view of Steuck et al (US 4,618,533). Callahan does not specifically disclose the microporous substrate being polyvinylidene fluoride. Steuck, however, teaches a porous membrane for use in separation comprising a porous membrane including polyethylene and polyvinylidene fluoride (column 2, lines 60-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute polyvinylidene fluoride for the polyethylene of the Callahan invention since two polymers have been shown in the art to be recognized equivalent porous membranes in separation processes.
7. Claims 1-9, 12-17, 19, 21, 22, and 48-58 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Witham et al (US 6,193,077). Witham teaches a composite porous membrane comprising a hydrophobic substrate coated with difunctional surface-modifying molecules. The hydrophobic substrate is ppolyethersulfone membrane having a pore size of 0.1 to 20 μm (column 4, lines 28-30). The difunctional surface-modifying molecule comprises ethoxylated bisphenol A diacrylate which is present in an amount of 0.1 to 0.7wt% (column 4, lines 50-52, column 5, lines 26-30). There is no pore plugging upon coating and curing (column 4, lines 5-8).

Likewise, the pore sizes of the coated composite porous membrane are substantially the same as the pore size of the composite porous membrane before coating. Similarly, the flow rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane. Since Witham was using the same material for the difunctional surface modifying molecule as Applicants, it is the examiner's position that the preferential association, wetting characteristics would be inherently present. Witham discloses that the membrane is autoclavable (column 4, lines 10-15). Accordingly, Witham anticipates or strongly suggests the claimed subject matter.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Steuck et al (US 4,618,533). Witham does not specifically disclose the microporous substrate being polyvinylidene fluoride. Steuck, however, teaches a porous membrane for use in filtration comprising a porous membrane including polyether sulfone and polyvinylidene fluoride (column 2, lines 60-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute polyvinylidene fluoride for the polyethersulfone of the Witham invention since two polymers have been shown in the art to be recognized equivalent porous membranes in filtration processes.
9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Hu et al

(US 5,209,849). Witham does not specifically disclose the use of a photoinitiator to achieve polymerization of the monomers over the entire surface of the membrane. Hu, however, discloses the use of DROCUR ® 1173 as a photoinitiator to achieve polymerization of the monomers over the entire surface of the membrane. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use UV treatment to achieve polymerization of the monomers over the entire surface of the membrane because UV treatment and plasma treatment have been shown in the art to be recognized equivalent treatments to impart hydrophilicity to a hydrophobic porous membrane.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Wu et al (WO 00/50161). US 6,780,327 will be relied on as an equivalent form of WO 00/50161 for convenience. Witham does not specifically disclose the crosslinked coating having been modified with a positive charge. Wu, however, teaches a porous membrane for use in filtration comprising a porous membrane and a crosslinked acrylic coating having a pendant cationic group linked to the backbone of the coating (column 4, lines 1-5, 30-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a coated membrane comprising a cross-linked coating that has fixed negative charges motivated by the desire to make the coated membrane suitable for filtration of fluids containing negatively charged materials.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of WO 00/50160. Hou et al (US 6,783,937) will be relied on as an equivalent form of WO 00/50160. Witham does not specifically disclose the cross-linked coating having been modified with a negative charge. Hou, however, teaches a porous membrane for use in filtration comprising a porous membrane and a cross-linked acrylic coating having fixed negative charge (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a coated membrane comprising a cross-linked coating that has fixed negative charges motivated by the desire to make the coated membrane suitable for filtration of fluids containing positively charged materials.

Response to Arguments

12. The art rejections over Steuck et al (US 4,618,533) and Wang et al (US 5,137,633) separately have been withdrawn because neither Steuck nor Wang teaches or suggest a difunctional surface modifying molecule comprising a hydrophobic portion preferentially associated with the substrate. Steuck and Wang disclose polyethylene glycol diacrylate which does not have a hydrophobic portion as set forth in the claims.
13. The art rejections based on Callahan have been maintained for the following reasons. Applicants argue that Callahan uses significantly different materials than those used by Applicants. The examiner respectfully disagrees. Callahan discloses the curable resin mixture comprising ethoxylated bisphenol A acrylate

and diacrylate ester of bisphenol A epoxy resin. Either one of them would reads on Applicants' difunctional surface modifying molecule. Applicants argue that Callahan's UV curable resin having a viscosity that is significantly greater than the viscosity of the material disclosed in the present invention. The arguments are not found persuasive because they are not commensurate in scope with the claims because nothing specific about the viscosity has been incorporated in the claims. Applicants argue that Callahan's materials and techniques yield a coated membrane having a pore sizes that are smaller than the pore size of the uncoated membrane. The examiner respectfully disagrees. Callahan teaches the membrane being coated with a UV curable resin having a sufficiently high viscosity to prevent pore filling upon coating and curing (abstract). Likewise, the flow rate through the pores of the coated membrane would be substantially the same as the flow rate through the pores of the non-coated membrane.

Applicants argue that the UV resin present in the mixture in an amount of about 1 wt% to 99 wt%. Callahan does not teach or suggest the amount in the claimed range. That is not technically correct. Callahan discloses the amount of the UV resin could be used down to 1wt% which would read on "less than about 1 wt%" because to the examiner, "about" means $\pm 10\%$ of the range, namely less than 1.1 wt% or less than 0.9 wt%. Alternatively, since the concentration is recognized as a result-effective variable, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical or provides unexpected

results. Therefore, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the UV resin or reactive diluent in an amount of less than 1 wt% in view of cost effectiveness, permeability/selectivity of the coated membrane. This is in line with *In re Aller*, 105 USPQ 233 which holds discovering the optimum or workable ranges involves only routine skill in the art.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-

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1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HV

Hai Vo

**HAIVO
PRIMARY EXAMINER**